DOCUMENT RESUME

ED 434 350 CS 216 907

AUTHOR Taylor, Jefferey H.
TITLE Computers: Tools of Oppression, Tools of Liberation.
PUB DATE 1996-03-00
NOTE 16p.; Paper presented at the Annual Meeting of the Conference on College Composition and Communication (47th, Milwaukee, WI, March 27-30, 1996).
PUB TYPE Opinion Papers (120) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computers; *Educational Benefits; Higher Education; Internet; *Student Reaction; Word Processing
IDENTIFIERS *Communication Context; *Computer Assisted Writing; Historical Background; Technology Integration

ABSTRACT

This paper contends that students who are learning to use computers can benefit from having an overview of the history and social context of computers. The paper highlights some milestones in the history of computers, from ancient times to ENIAC to Altair to Bill Gates to the Internet. It also suggests some things for students to think about and do, such as writing down good things about computers or ways that computers help people, and presents some typical student responses. The paper concludes by presenting some salient issues and ideas in this "Information Age," pointing out that computers represent an incredible opportunity to enhance abilities and communication with each other, but noting that "computers and networks for all their power are just tools." (NKA)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 434 350

"Computers: Tools of Oppression, Tools of Liberation"

Jefferey H. Taylor, PhD

Assistant Professor of English

St. Louis Community College - Meramec

CCCC March 1996 Milwaukee

I. Why Contextualize Computer Use?

I try to contextualize computers for students while they are learning to use them. As a kid I dreamed that someday I would have a computer on my desk, like the kid in the Jetsons, but computers were still bulky, room-size machines, and the dream seemed rather distant. For most of my students, personal computers have been commonplace as long as they can remember. But that does not make computers any less mysterious to them, and perhaps makes them even more mysterious, since an unseen mystery might not be as disturbing as one sitting on the desk. I like to get students thinking about computers and their social implications before we start using them as writing tools. I give them an overview of computer history and some of the main social issues involving computer technology, and then get them to talk about them and write about them.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✔ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

J. Taylor

BEST COPY AVAILABLE

CS 216 907

One reason to give students an overview of the history and social context of computers is that it helps them see computers as a part of the history of the representation of meaning. 'Computer' is an outdated and misleading word for this machine. Calculations are just a small part of computers, just as math is but one possibility for the representation of information. The story of representation starts with the invention (or evolution) of language itself, then art and abstractions leading to writing, which appeared in Sumer (modern Iraq) about five thousand years ago in the form of cuneiform script pressed into clay tablets. That five thousand years is not a long time in the grand history of human communication, and what we have invented since then to better inscribe our words, from quills to word-processors, have all been extensions of this basic human ability and ancient urge: to record experience and to predict it. This is the essence of human consciousness. Computers are human tools made to enhance human consciousness. Or more simply, computers, like the cuneiform tablets of Sumer, help us preserve and use information.

II. Some Highlights from Computer History

A. The Sky Computer

The stars themselves are the earliest computer, used for counting time, organizing prediction, and mapping the Earth and the Heavens. To most everyone who has ever lived on Earth --most modern people such as ourselves being the big exception-- the stars, the sun and the moon have served as clock, calendar, and compass. Many things have been invented to aid human use of the Sky Computer, from Stonehenge to the sextant, from myths about sky gods to celestial charts and maps.

Many ancient peoples used the regular movements of the heavens to help them navigate the world's oceans. The word 'cyber' means 'pilot' in Greek. The Greeks used the Sky Computer as a guide to explore far and wide, making the Seven Seas their cash cow and widening their cultural perspectives and philosophical understanding. Today cybernauts also use computers to explore the world and cash in on what they find, intellectually and financially.

B. Pebbles, Gears and Looms

Calculating tools are as old as using pebbles as counters. The abacus, a variation on the idea of using pebbles as counters, was invented by the Babylonians in ancient times and taken to the Greek world by the Phoenicians at least by 500 B.C. The abacus was not superseded for many centuries. In the late 16th century John Napier of Scotland invented logarithms, making mechanical calculation possible, and eventually giving rise to the slide-rule, invented in 1621 by an English clergyman, William Oughtred. In the 17th century, Pascal, Liebniz, and other early greats made gear based calculating machines, but their theoretical models were often beyond the metallurgy of the times. Still Pascal's crude device, the Pascaline, was the basis for many mechanical calculators that came after. However, since computers are more than calculators, calculators are not their only ancestors. The most interesting ancestors of computers are the automatic looms of the early Industrial Revolution in 18th century England. The looms of the early radical industrialists used punch cards to program unheard of versatility in the design and implementation of textile weaving. It is interesting that at the beginning of the Industrial Age we find the roots of the Information Age in punch card driven looms. These early industries were founded by social reformers who were at first resisted by the status quo.

It is also interesting that employees of these early factories benefitted from such modern concepts as profit sharing and total quality management.

C. Babbage and Ada

In the early nineteenth century a few ingeniously crazy people such as Charles Babbage took the principles of Pascal's gears and the industrialists' looms to astonishing ends. . . almost. As with Pascal, Babbage's theories raced ahead of his ability to implement them, though his limitations had more to do with the politics of government funding than metallurgy. His greatest help was Augusta Ada, the daughter of the great Romantic poet, Lord Byron. As a part of Babbage's ultimate project, the Analytical Engine, she invented programming as we know it today, before there was really anything to program! Babbage never finished his last, best project, but his and Ada's work set the stage for everything that came after.

D. Census Blues

The invention of computing devices was moved forward greatly by government's need to count heads. And, lo, there went out a decree from Washington, DC that all the nation should be counted, and by the late nineteenth century the problem had escaped human efforts. The 1880 census had taken seven years to count; the 1890 census, it seemed, would not be counted before the next census began. In response to this looming disaster, the government sponsored a counting contest in hopes that someone would invent a machine to tabulate the 1890 census quickly. Many incredible and some very effective counting devices were entered into the contest, but Hans Hollerith's Electric Tabulating System beat all the others by many magnitudes and, indeed, outstripped even the highest expectations

of the Census Bureau. Hollerith later founded a company based on his device that later changed its name to IBM. These electromagnetic clackers changed the world and reigned supreme until the vacuum tub began to tackle the calculation problem.

E. Vacuum Tube Genies

The first vacuum tube computers were analog devices with specific, hard-wired purposes, mainly war purposes during World War II: computing trajectories, encoding and decoding messages. A famous example is the Enigma Machine. ENIAC, the first programmable (barely) electronic computer was a secret war project in the 1940s, though it was not finished until after the war. (Interestingly, IBM refused the chance to be part of the project, deeming the idea impractical.) One of the first things ENIAC did was some calculations to demonstrate the viability of the hydrogen bomb! These were the Secret Project years of computer cloisters with teams of computer priests tending rooms of tubes and wire for the government, the military, and soon for any company that could afford millions to rent a UNIVAC and a herd of nerds. Throughout the first few decades of the post-War period, computing power was the sole and sacred property of the rich and powerful. This all changed in the mid-1970s in a dramatic, populist revolution.

F. Ed's Revolution and Bill's Big Idea

The TRANSISTOR was invented about the same time as ENIAC but did not become part of computers for many years. Indeed, its inventors, Bell Labs, did not at first think the transistor would ever amount to much, and/so for a number of years it did not. About the time some Japanese firms were getting rich off transistor radios --I know I had one-- researchers at a few American firms were

wondering just how many transistors they could pack on an integrated circuit board and were looking to silicon with interest. The silicon wafer, or computer chip, is essentially a very dense circuit board housing many, many tiny transistors.

By the early 1970s chip technology had reduced the price of computing power from a million dollars a year rent (plus the necessary staff of gurus) to about a hundred-thousand dollars paid for, and, supposedly, easy-to-operate, what Intel called "the new cheapies." Still, this was not going to get a computer into my home. And that probably would have been much longer in coming if not for a man by the name of Ed Roberts of Alburquerque, New Mexico. In 1974 Roberts began selling his Altair computer kit, based on Intel's 8080 microprocessor. The price was $420 -- assembly required. I do not imagine Intel (nor the other powers-that-be) would have let Roberts buy any 8080s if they would have known what was going to happen. His ad was in *Popular Electronics* for over a year before even the editors of the magazine knew it was there, and the orders had been pouring in. By the time anyone but his customers knew about the Altair the *coup d'etat* had already happened! The computer had slipped out of the hands of the power elite and into the hands of . . . almost everyone! Within a few years relatively cheap computers could be purchased at discount stores, fully assembled and ready to plug into the family TV. Of course before that could happen, someone had to make computers relatively easy to use; after all, the first Altair had no keyboard, ran only on machine language and communicated by a row of blinking lights. One of the first people to take interest in the Altair was a young man by the name of Bill Gates. He and his friend Paul Allen had the wild idea of producing a version of the BASIC programming language for the Altair. Their wild idea worked, making computer use possible for people other than computer scientists and physicists, and thereby launching the first company to produce software for micro-computers, hence the name: Microsoft,

now the world's largest corporation. (For more information on Ed Roberts's revolution, see Herbert 62-3, and Shurkin 307-9)

G. All Together Now

Once many people had home computers, linking them to each other was the next logical step, especially in a democratic society where education and communication are the keys to our freedoms. Luckily modem technology somewhat preceded the home computer. Bulletin Board Services (BBS) sprang up early on to fill this linking function, serving as virtual networks, and many are still around. The Defense Department started ARPANET as a part of the national strategic defense. This network eventually became the INTERNET. When the INTERNET first spread beyond the military to researchers at universities and colleges, it was intended for academic purposes only, and commercial activity was strictly prohibited. That policy was ended really only a few years ago, though already now the INTERNET has become inextricably linked in the American mind with high commercial venture. The NET in its evolution has followed the pattern set by computers themselves: from secret to academic to commercial and popular.

However, the academic intentions of the INTERNET have not disappeared despite the commercial turn of things. Yet, as with any medium of communication, people and their institutions will use computers to enhance their abilities and liberate their desires, or they will allow others to program content for them, to direct what they will see, hear, feel, think and do, and how they will pay for it. We need to teach students about the social contexts of computers, and teach them computer literacy skills, so that they can empower themselves to more effectively find, evaluate, and synthesize information, and publish the information that they develop. Computers and networks as the most

excellent of communication tools naturally enhance democratic society, but as always, only to the extent that citizens empower themselves with the education and tools they need to affect worthwhile social change.

III. For Students to Think about and to Do

One thing I ask students to do is to write down a list of some bad things about computers, or ways that computers are used to hurt people. Then I ask them to write down good things about computers, or ways that computers help people. Here are some typical responses.

Tools of Oppression (or How Computers Hurt)

* Businesses sometimes program their computers to cheat people, recently power companies and phone companies have been caught overcharging through faulty computer programs. Another example is that some companies send bills on the day most likely to cause late fees.

* People and companies hide behind their computers, blaming "computer error" for what went wrong. Computers do what they are told to do; somewhere a person is responsible for the problem. Imagine if your car accidentally slipped into gear and smashed into a store. Could you just say "oops! automobile error!" and walk away? Software disclaimers are similarly strange. Imagine if an

automobile or a hair dryer had a tag on it that said the manufacturer offers no guarantee that the product will actually work!

* Some businesses and other organizations keep records on you for their own good but not yours: for marketing, politics, policing, and so on.

* We have access to too much information; we are drowning in the Information Overload Age. Also, how do we know what information is good? There is a lot of junk information on the Internet.

* There is a widening gulf of illiteracy in the world. If you know how to read and write you are a member of the fastest shrinking minority in the world. Now add computer literacy to the equation. Is this not a formula for world-wide social disaster?

* Bad information drives out the good. I heard a story on the radio about a man who had been declared dead by a bank computer which had then spread the news to other databases. He spent years proving himself still alive and fixing the data in many databases, but data moves at the speed of light, and the bad information was always one step ahead of him.

Tools of Liberation (or How Computers Help):

** Computers allow consumers to catch cheating companies. The journalists who recently (1996) caught MCI cheating customers used computers to prove their allegations. With a cheap computer

you can monitor your own electricity usage, phone service, and so on. Frank Herbert (of *Dune* fame) argued many years ago that the personal computer can and should be used by common people to fight the power of government, big corporations and other organizations that impinge on our lives.

> What can you do?
>
> Get your own computer. Learn how to use it. . . . If you don't do this, the Bill of Rights is dead and your individual liberties will go the way of the dodo.
>
> (Herbert 16)

•• With a computer you can generate your own annoyingly officious business letters responding to those that the computers of companies generate to you. Your letters can look official and important too!

•• Computers can help grass-roots political organizing, since they allow a few people to keep track of lots of information. Desk-top Publishing has allowed a wide variety of people to publish their ideas and calls for activity. Networks such as the Internet and local BBS's have allowed like-minded people throughout the country and around the world to communicate with each other and rally together for their common ends.

•• Sometimes databases with information about you can help you rather than hurt. Target marketing can actually cut back on the amount of junk mail you receive. Health care information in a pharmacy database or at a hospital can help keep you healthy or even save your life. Police computers,

hopefully, are being used to help society not hurt, for example, databases used to find lost children or catch dangerous fugitives.

** Computers allow you to keep information about yourself! You can keep track of your consumer activities and analyze your own habits. Why wait for the marketers to do a sloppy job at it? You can use a genealogy program to map out your family tree and keep track of your connections. You can use word processing to keep your journal or diary.

** You can use word processing and desk-top publishing to express your own ideas--real freedom of the press! Art and music are other possibilities.

** Access to too much information can be good! Through the Web we have access to voices other than the standard canon that the big publishing houses feed us. Certainly not every site on the Web can be trusted as a good source of information, but not every book in the library can be trusted either. The problems associated with evaluating Web sources are not very different from those associated with evaluating traditional library sources. Access to more voices is a good thing! The trust issue just helps us remember to be critical about all the information we receive, whatever the source.

** Word processing is the best thing that has happened to writing since its invention in Sumer five thousand years ago. The best thing about word processing is that it wonderfully supports the Writing as a Process theory of composition. The virtual nature of word processing allows for more inventive freedom during pre-writing, more fluid communicating during drafting, and inevitably invites and

facilitates revision. Computer Assisted Composition (CAC) fits Writing as a Process like a glove. Inevitably writers will need to write with word processors or be left behind by those who do.

IV. Issues and Ideas

Powerful tools always come with problems, and they can always be used for good ends and bad. The rising tide of the Information Age is a hard wave to ride, but it is a very valuable challenge for the courageous and committed. The genie is out of the bottle. We need to learn to use this latest and best enhancement to the basic drives of human consciousness or be left behind by those who are taking advantage of these tools. Word processing is the best example. These days more computer time is spent word processing than any other computer operation world wide because it allows people to enhance their written communications in extraordinary ways. The computer is an extensions of human consciousness, not because it is radically new, but because it is an extension of the oldest of human activities, recording experience, and experimenting with it. Computers have even spawned new forms of human expression, from hyperpoetry to fractal-based art to computer enhanced special effects in movies. And, in truth, it is early days yet; we have just begun this journey of the self into cyberspace.

Let's take a look again at the roots of Industrialism in the punch card driven loom. Weaving is the oldest of finger trades of greater apes. Even gorillas weave mats, though they seem to have little use for them. Weaving was automated by social reformers in the late 1700s in rebellion against the sweatshop social order of the day. The punch cards gave those looms the flexibility to weave many

different patterns and textures with easy reprogramming that opened up possibilities for textiles that had not yet been imagined or that otherwise would have been incredibly complicated and therefore impractical to produce. Punch card automation enhanced the creative power of the weavers. This is what computers do for us today; they allow us to experiment with the patterns and textures of meaning and expression, that is, to program ourselves. Weaving is what we do; it is how we make meaning. Computers are a powerful medium of human expression, and for many years that power was in the hands of a few, for good and ill. Now they are in our hands, and good or ill will continue to flow through them from us. We must choose what ends our hands will serve, and to choose we must know what the choices are and how they impact our lives and the lives of others. I give students some background on computers, a few social observations, and then I let them tell me what computers have done to them and for them.

V. Ivory Towers and Satellites

One more story about reinventing the world: The folks who invented ENIAC in the late 1940s did not know what they were doing, really. They were on the cutting edge of technology, discovering the unknown, but they knew little more about the social futures they were creating than anyone else. They saw computers as evolving slowly and crudely with cloistered priests tending to giant mazes of tubes and wires to crunch numbers for the power elite -- well, they had no way to know what the transistor and silicon would do to their field. Now look at this Brave New Information Age with such machines in it, enhancing consciousness in a box, and transmitting it to orbiting satellites and around

the world! Yet few people at the beginning of this century, when electronics was in its infancy, thought that Einstein's relativity theories and Planck's quantum theory would ever mean much to the practical affairs of the world--just ivory tower junk! Yet today we need relativity theory to be able to broadcast to satellites and back to Earth: without it the target would be missed by many miles. And quantum mechanics must be taken into account to make transistors and silicon microchips. Think about it! Without these worthless ivory tower notions from theoretical physics we would still be back in the cloistered days of the UNIVAC, with the genie safely encased in vacuum tubes and responding only to the needs of the powerful few.

Can we get excited about this incredible opportunity before us to enhance our abilities and opportunities to communicate with each other and the world? We must! And we must pass on that excitement to students, many of whom already find computers boring and mundane because computers have always been ubiquitous to their lives, but also because they have not yet learned to use them to help them realize their own desires and create their own dreams. Computers and networks for all their power are just tools. The excitement must be in the chance these tools offer us for creative, life enhancing, world changing communication.

Works Cited

Haraway, Donna. "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s." CyberReader. Ed. Victor J. Vitanza. Boston: Allyn and Bacon, 1996. 372-412.

Herbert, Frank and Max Barnard. Without Me You're Nothing. New York: Simon and Schuster, 1980.

Shurkin, Joel. Engines of the Mind. New York: Norton, 1996.